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| Chapter 17 Mixed Review  *Match each item with the correct statement below.*   |  |  |  |  | | --- | --- | --- | --- | | a. | heat of reaction | f. | heat of vaporization | | b. | heat of formation | g. | heat of condensation | | c. | exothermic reaction | h. | heat capacity | | d. | heat of fusion | i. | specific heat | | e. | heat of solution | j. | endothermic reaction | | | |
| 1. \_\_\_\_\_\_\_the enthalpy change for a chemical reaction exactly as it is written | | |
| 2. \_\_\_\_\_\_\_the enthalpy change caused by dissolving a substance | | |
| 3. \_\_\_\_\_\_\_the energy required to melt a solid at its melting point | | |
| 4. \_\_\_\_\_\_\_the change in enthalpy that accompanies the formation of a compound from its elements | | |
| 5. \_\_\_\_\_\_\_a chemical reaction that gives off heat | | |
| 6. \_\_\_\_\_\_\_a chemical reaction that absorbs heat | | |
| 7. \_\_\_\_\_\_\_the energy required to turn a liquid into a gas | | |
| 8. \_\_\_\_\_\_\_the energy given off when a gas turns into a liquid | | |
| 9. \_\_\_\_\_\_\_The amount of heat needed to increase the temperature of an object exactly 1°C | | |
| 10. \_\_\_\_\_\_\_The amount of heat needed to increase the temperature of 1 g of a substance 1°C | | |
|  | | |
| *Classify each of these statements as true or false*.  **11.** Δ*H*fus = – Δ*H*solid  **12.** Melting and vaporization are exothermic processes.  **13.** In order to convert 1 mole of H2O(*l*) to 1 mol of H2O(*g*), 40.7 kJ must be supplied.  **14.** As ice melts, the temperature of the ice increases until the entire sample becomes liquid.  **15.** When ammonium nitrate dissolves in water, the solution gets cold. This is an example of an exothermic reaction.  **\_\_\_\_\_\_\_\_16.** The sign of Δ*H* is negative for an exothermic reaction.  **\_\_\_\_\_\_\_\_17.** If 129 kJ of heat is required to decompose 2 moles of NaHCO3, then 258 kJ is required to decompose 4 moles of NaHCO3.  **18.** The physical state of the reactants and products in a thermochemical reaction are not important when calculating Δ*H* of the reaction.  **19.** In endothermic reactions, the potential energy of the product(s) is higher than the potential energy of the reactants.  **20.** The equation CaO(*s*) + H2O(*l*) → Ca(OH)2(*s*) Δ*H* = 65.2 kJ is an example of a thermochemical equation. | | |
| 21. | In an exothermic reaction, the energy stored in the chemical bonds of the reactants is \_\_\_\_.   |  |  | | --- | --- | | a. | equal to the energy stored in the bonds of the products | | b. | greater than the energy stored in the bonds of the products | | c. | less than the energy stored in the bonds of the products | | d. | less than the heat released | |
| 22. | A process that releases heat is a(n) \_\_\_\_.   |  |  |  |  | | --- | --- | --- | --- | | a. | polythermic process | c. | ectothermic process | | b. | exothermic process | d. | endothermic process | |
| 23. | What is the amount of heat required to raise the temperature of 200.0 g of aluminum by 10mc013-1.jpgC? (specific heat of aluminum = 0.21cal/ g C )   |  |  |  |  | | --- | --- | --- | --- | | a. | 420 cal | c. | 42,000 cal | | b. | 4200 cal | d. | 420,000 cal | |
| 24. | Which of the following is a valid unit for specific heat?   |  |  |  |  | | --- | --- | --- | --- | | a. | mc014-1.jpg | c. | mc014-2.jpg | | b. | cal | d. | mc014-3.jpgC | |
| 25. | How can you describe the specific heat of olive oil if it takes approximately 420 J of heat to raise the temperature of 7 g of olive oil by 30mc015-1.jpgC?   |  |  |  |  | | --- | --- | --- | --- | | a. | greater than the specific heat of water | c. | equal to the specific heat of water | | b. | less than the specific heat of water | d. | Not enough information is given. | |
| 26. | What does the symbol mc016-1.jpg*H* stand for?   |  |  | | --- | --- | | a. | the specific heat of a substance | | b. | the heat capacity of a substance | | c. | the heat of reaction for a chemical reaction | | d. | one Calorie given off by a reaction | |
| 27. | What is the standard heat of reaction for the following reaction? Zn(*s*) + Cumc017-1.jpgmc017-2.jpg(*aq*) mc017-3.jpg Znmc017-4.jpg(*aq*) + Cu(*s*) (mc017-5.jpg*Hmc017-6.jpg* for Cumc017-7.jpg = +64.4 kJ/mol; mc017-8.jpg*Hmc017-9.jpg* for Znmc017-10.jpg = –152.4 kJ/mol)   |  |  |  |  | | --- | --- | --- | --- | | a. | 216.8 kJ released per mole | c. | 88.0 kJ absorbed per mole | | b. | 88.0 kJ released per mole | d. | 216.8 kJ absorbed per mole | |
| 28. | Which of the following is NOT a form of energy?   |  |  |  |  | | --- | --- | --- | --- | | a. | light | c. | heat | | b. | pressure | d. | electricity | |
| 29. | Which of the following is transferred due to a temperature difference?   |  |  |  |  | | --- | --- | --- | --- | | a. | chemical energy | c. | electrical energy | | b. | mechanical energy | d. | heat |     30. The specific heat capacity of graphite is 0.71 sa021-1.jpg. Calculate the energy required to raise the temperature of 750 g of graphite by 160sa021-2.jpgC  31. How much heat is released when 50g of ammonia (NH3) freezes?  32. How much heat is required to raise the temperature of 8.4 sa023-1.jpg 10sa023-2.jpg g of aluminum by 42sa023-3.jpgC? (specific heat of aluminum = 0.21 cal /gC )  33. If 500 g of iron absorbs 22,000 cal of heat, what will be the change in temperature? (specific heat of iron = 0.11 cal/g C)  34. When ethanol, C2H6O(l), burns, it reacts with O2(g) to produce CO2(g) and H2O(l) and 1368kJ of heat is released. Write the balanced thermochemical equation for this reaction.  **35.** How much heat is absorbed when 63.7 g of H2O(*l*) at100°C and 101.3kPa is converted to gas at 100°C? Express your answer in kJ. ∆Hvap = 40.7kJ/mol  **36.** How many kilojoules of heat is absorbed when 0.46g of chloroethane (C2H5Cl, bp 12.3⁰C) vaporizes at its normal boiling point? The molar heat of vaporization of chloroethane is 24.7kJ/mol. |